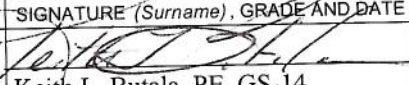
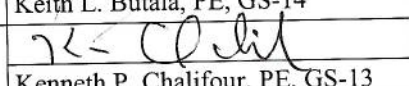
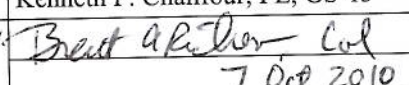


STAFF SUMMARY SHEET

| | TO | ACTION | SIGNATURE (Surname), GRADE AND DATE | | TO | ACTION | SIGNATURE (Surname), GRADE AND DATE |
|---|------------|---------|---|----|----|--------|-------------------------------------|
| 1 | 10 CES/DCE | Sign |  Keith L. Butala, PE, GS-14 | 6 | | | |
| 2 | 10 CES/CEP | |  Kenneth P. Chalifour, PE, GS-13 | 7 | | | |
| 3 | DFER | approve |  Brent A. Butler, Col 7 Oct 2010 | 8 | | | |
| 4 | | | | 9 | | | |
| 5 | | | | 10 | | | |

SURNAME OF ACTION OFFICER AND GRADE

SYMBOL

PHONE

TYPIST'S
INITIALS

SUSPENSE DATE

Hume, GS-12

10 CES/CEPM

333-8439

RJH

Not Applicable

SUBJECT

Clearance for Material for Public Release

USAFA-DF-PA-

493

DATE

20101006

SUMMARY

1. PURPOSE. To provide security and policy review on the document at Tab 1 prior to release to the public.

2. BACKGROUND.

Authors: Russell Hume

Title: US Air Force Academy Energy - Solar Array

Circle one: Abstract Tech Report Journal Article Speech Paper Presentation Poster

Thesis/Dissertation Book Other: _____

Description:

Release Information: Mr. Billings briefing


Previous Clearance information: None

Recommended Distribution Statement: Approved for public release
(Distribution A, Approved for public release, distribution unlimited.)

3. DISCUSSION.

4. VIEWS OF OTHERS.

5. RECOMMENDATION. DCE sign SSS. Required by DF for briefing. DFER reviews for policy and security. Coordination indicates the document is suitable for public release. Suitability is based on the document being unclassified, not jeopardizing DoD interests, and accurately portraying official policy [Reference DoDD 5230.09]. Release is the decision of the originator (author). Compliance with AFI 35-102 is mandatory.


Russell J. Hume
Mechanical Engineer

Tab

1. Briefing to Mr. Billings

HQ U.S. Air Force Academy

Integrity - Service - Excellence

US Air Force Academy Energy – Solar Array





USAF Energy Initiatives

Complete/Under Contract



U.S. AIR FORCE



Conservation, Innovation, Education

The Air Force Net Zero Installation



USAF Energy Initiatives

- 1 Ground Source Heat Pumps at Batting Cages
 - o Installed 2006
- 2 Photovoltaic Roofing on East Tower of Vandenberg Hall
 - o 235 kW – Installation in progress
- 3 Ground Source Heat Pumps at Entry Control Points C-1 and C-2
 - o Installed 2004
- 4 Maxicon Irrigation Control System
 - o Installed 2010
- 5 Methane Recovery Sludge Reheat at Waste Water Treatment Plant
 - o Installed 1998
- 6 30 kW Microturbine Burning Digester Gas
 - o Installed 2004
- 7 6MW Solar Array Funded with ARRA funds
 - o Construction to begin Fall. Power in Mar 2011
- 8 Ground Source Heat Pumps at Visitor Pass and Identification
 - o Installed in 2003
- 9 Ground Source Heat Pumps at South Gate
 - o Installed in 2003



U.S. Air Force

A NEW CULTURE:

THINK GREEN, BUILD GREEN,

Fly Blue



✓ - Complete



USAFA Energy Initiatives

Under Evaluation



U.S. AIR FORCE

Conservation, Innovation, Education

The Air Force Net Zero Installation



USAFA Energy Initiatives

- 1 Low Profile Wind in Cadet Area
 - o Working with NREL on Wind Study
- 2 Photovoltaic Roofing on West Tower of Vandenberg Hall
 - o 437 kW – In Future Renovation Phase
- 3 Ground Source Heat Pumps at Harmon Hall
 - o Working Funding
- 4 Gravity Feed Water Line
 - o Part of Utilities Privatization Initiative
- 5 Co-Generation at Central Heat Plant
 - o Under Review with NREL
- 6 Decentralization of Community Center Area from Central Heat Plant
 - o ECIP Funding Solicited and Pending
- 7 Waste to Energy Gasifier
 - o Working With Army – Benet Laboratories
- 8 Car Pool Lot
 - o Working NEPA Process

Other Energy Initiatives Not Shown

- o Dry Fermentation Biomass
- o Large Wind
- o Hydroelectric Power
- o Woody Biomass



U.S. Air Force

A NEW CULTURE:

THINK GREEN, BUILD GREEN,

Fly Blue





U.S. AIR FORCE

ARRA Funded Solar Power Project – Initial Concept

- \$18.3 M provided to USAFA through ARRA
- ARRA funds used as “connect charge” under Colorado Springs Utilities (CSU) existing area-wide utility services contract through GSA
- CSU constructs, owns and operates the array; provides a minimum of 4,450 MWh/yr to USAFA at \$0.00 per kW/h generation charge and minimal (~\$0.01 per kW/h) demand and O&M charge
- Saves USAFA ~\$232K per annum in electric (~4% of USAFA’s annual electric bill of ~\$6M)
- CSU sells Renewable Energy Certificates (REC); value to USAFA (est. ~\$668K per year)
- Combination of savings and REC value gives a simple payback of ~11 yrs.



U.S. Air Force

A NEW CULTURE:

THINK GREEN, BUILD GREEN,

Fly Blue



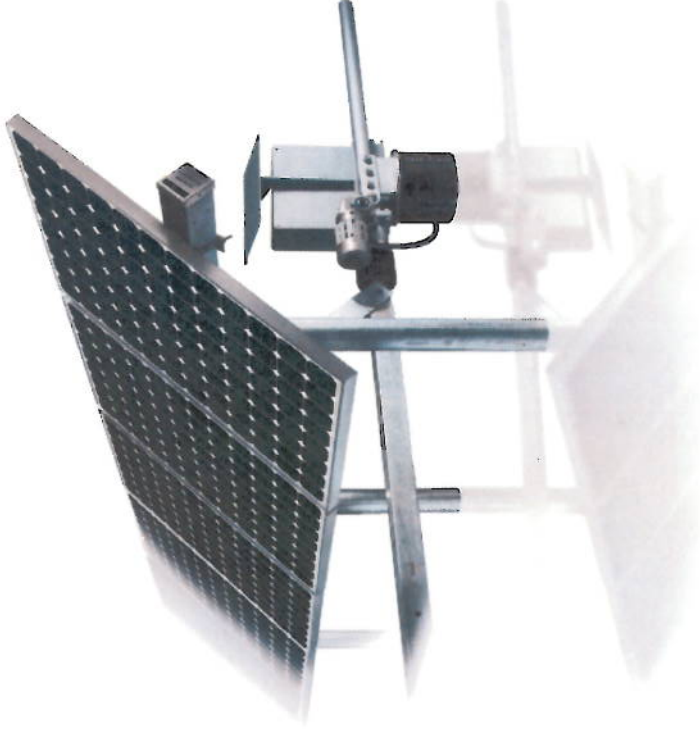


USAFA Solar Array



U.S. AIR FORCE

- PPA signed!
- 50% civil design plans submitted
- 6 MW peak power (~5.2 DC)
 - 19,056 modules
 - 30 drive motors, 4,764 piers
- 11,000 MWh per year
- ~11% of USAFA's load
- ~\$550K in cost utility avoidance per year
- ~\$775K potential in REC sales
- Equipment order by 29 Sep 10
- On-site construction in Nov 10
- Power production start in Mar 11



U.S. Air Force
A NEW CULTURE:

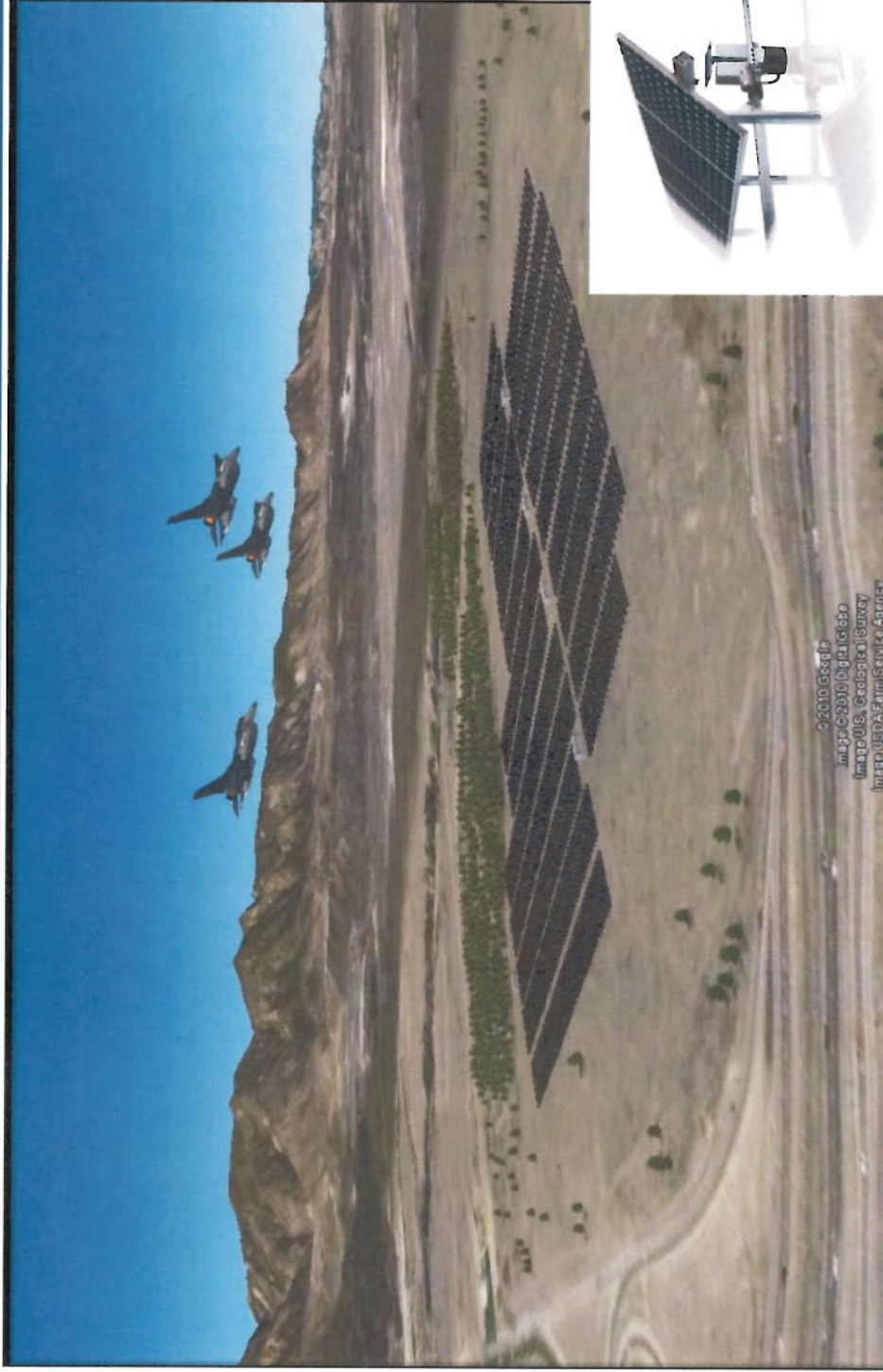
THINK GREEN, BUILD GREEN,

Fly Blue





U.S. AIR FORCE



© 2010 Google
Image © 2010 DigitalGlobe
Image US, Geological Survey
Image USFA Farm Service Agency



U.S. Air Force

A NEW CULTURE:

THINK GREEN, BUILD GREEN,

Fly Blue





U.S. AIR FORCE



U.S. Air Force
A NEW CULTURE:

THINK GREEN, BUILD GREEN,

Fly Blue



Integrity - Service - Excellence